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#### 11. INTAKE OF MEAT AND DAIRY PRODUCTS

Consumption of meat, poultry, and dairy products is a potential pathway of exposure to toxic chemicals. These food sources can become contaminated if animals are exposed to contaminated media (i.e., soil, water, or feed crops).

The U.S. Department of Agriculture's (USDA) Nationwide Food Consumption Survey (NFCS) and Continuing Survey of Food Intakes by Individuals (CSFII) are the primary sources of information of intake rates of meat and dairy products in the United States. Data from the NFCS have been used in various studies to generate consumer-only and per capita intake rates for both individual meat and dairy products and total meat and dairy products. CSFII 1989-1991 survey data have been analyzed by EPA to generate per capita intake rates for various food items and food groups. As described in Volume II, Chapter 9, consumer-only intake is defined as the quantity of meat and dairy products consumed by individuals who ate these food items during the survey period. Per capita intake rates are generated by averaging consumer-only intakes over the entire population of users and non-users. In general, per capita intake rates are appropriate for use in exposure assessments for which average dose estimates for the general population are of interest because they represent both individuals who ate the foods during the survey period and individuals who may eat the food items at some time, but did not consume them during the survey period.

Intake rates may be presented on either an as consumed or dry weight basis. As consumed intake rates (g/day) are based on the weight of the food in the form that it is consumed. In contrast, dry weight intake rates are based on the weight of the food consumed after the moisture content has been removed. In calculating exposures based on ingestion, the unit of weight used to measure intake should be consistent with those used in measuring the contaminant concentration in the produce. Fat content data are also presented for various meat and dairy products. These data are needed for converting between residue levels on a whole-weight or as consumed basis and lipid basis. Intake data from the individual component of the NFCS and CSFII are based on "as eaten" (i.e., cooked or prepared) forms of the food items/groups. Thus, corrections to account for changes in portion sizes from cooking losses are not required.

The purpose of this section is to provide: (1) intake data for individual meat and dairy products, total meat, and total dairy; (2) guidance for converting between as consumed and dry weight intake rates; and (3) data on the fat content in meat and dairy products. Recommendations are based on average and upper-percentile intake among the general population of the U.S. Available data have been classified as being either a key or a relevant study based on the considerations discussed in Volume I, Section 1.3.1 of the Introduction. Recommendations are based on data from the CSFII survey, which was considered the only key intake study for meats and dairy products. Although Pao et al. (1982) was not considered a key study for intake of meats and dairy products because it is based on data from NFCS 1977-1978, it was included as a key study for serving size. Other relevant studies are also presented to provide the reader with added perspective on this topic. It should be noted that most of the studies presented in this section are based on data from USDA's NFCS and CSFII. The USDA NFCS and CSFII are described below.

#### 11.1. INTAKE STUDIES

#### 11.1.1. U.S. Department of Agriculture Nationwide Food Consumption Survey and Continuing Survey of Food Intake by Individuals

The NFCS and CSFII are the basis of much of the data on meat and dairy intake presented in this section. Data from the 1977-78 NFCS are presented because the data have been published by USDA in various reports and reanalyzed by various EPA offices according to the food items/groups commonly used to assess exposure. Published one-day data from the 1987-88 NFCS are also presented. Recently, EPA conducted an analysis of USDA's 1989/91 CSFII. These data are the most recent food survey data that are available to the public. The results of EPA's analyses are presented here. Detailed descriptions of the NFCS and CSFII data are presented in Volume II, Chapter 9 - Intake of Fruits and Vegetables.

Individual average daily intake rates calculated from NFCS data are based on averages of reported individual intakes over one day or three consecutive days. Such short term data are suitable for estimating average daily intake rates representative of both short-term and long-term consumption. However, the distribution of average daily intake rates generated using short term data (e.g., 3 day) do not necessarily reflect the long-term distribution of average daily intake rates. The distributions generated from short term and long term data will differ to the extent that each individual's intake varies from day to day; the distributions will be similar to the extent that individuals' intakes are constant from day to day.

Day-to-day variation in intake among individuals will be great for food item/groups that are highly seasonal and for items/groups that are eaten year around but that are not typically eaten every day. For these foods, the intake distribution generated from short term data will not be a good reflection of the long term distribution. On the other hand, for broad categories of foods (e.g., total vegetables) which are eaten on a daily basis throughout the year with minimal seasonality, the short term distribution may be a reasonable approximation of the true long term distribution, although it will show somewhat more variability. In this and the following section then, distributions are shown only for the following broad categories of foods: meats and dairy products. Because of the increased variability of the shortterm distribution, the short-term upper percentiles shown will overestimate somewhat the corresponding percentiles of the long-term distribution.

# 11.1.2. Key Meat and Dairy Products Intake Study Based on the CSFII

U.S. EPA Analysis of 1989/91 USDA CSFII Data -EPA conducted an analysis of USDA's 1989-91 CSFII data set. The general methodology used in analyzing the data is presented in Volume II, Chapter 9 (Fruits and Vegetables) of this Handbook. Intake rates were generated for the following meat and dairy products: total meats, total dairy, beef, pork, poultry, game, and eggs. These data have been corrected to account for mixtures as described in Volume II, Chapter 9 and Appendix 9A. Per capita intake rates for total meat and total dairy are presented in Tables 11-1 and 11-2 at the end of this Chapter. Table 11-3 presents per capita intake data for individual meats. The results are presented in units of g/kg-day. Thus, use of these data in calculating potential dose does not require the body weight factor to be included in the denominator of the average daily dose (ADD) equation. It should be noted that converting these intake rates into units of g/day by multiplying by a single average body weight is inappropriate, because individual intake rates were indexed to the actual body weights of the survey respondents. However, if there is a need to compare the total intake data presented here to other intake data in units of g/day, a body weight less than 70 kg (i.e., approximately 60 kg; calculated based on the number of respondents in each age category and the average body weights for these age groups, as presented in Volume I, Chapter 7) should be used because the total survey population included children as well as adults.

The advantages of using the CSFII data set are that the data are expected to be representative of the U.S.

population and that it includes data on a wide variety of food types. The data set is the most recent of a series of publicly available data sets (i.e., NFCS 1977/78; NFCS 1987/88; CSFII 1989-91) from USDA, and should reflect current eating patterns in the United States. The data set includes three years of intake data combined. However, the CSFII data are based on a three day survey period. Short-term dietary data may not accurately reflect long-term eating patterns. This is particularly true for the tails of the distribution of food intake. In addition, the adjustment for including mixtures adds uncertainty to the intake rate distributions. The calculation for including mixtures assumes that intake of any mixture includes all of the foods identified and the proportions specified in Appendix Table 9A-1. This assumption yields valid estimates of per capita consumption, but results in overestimates of the proportion of the population consuming individual meats; thus, the quantities reported in Table 11-3 should be interpreted as upper bounds on the proportion consuming beef, pork, and poultry, not as valid point estimates.

# 11.1.3. Key Meat and Dairy Products Serving Size Study Based on the USDA NFCS

Pao et al. (1982) - Foods Commonly Eaten by Individuals - Using data gathered in the 1977-78 USDA NFCS, Pao et al. (1982) calculated percentiles for the quantities of meat, poultry, and dairy products consumed per eating occasion by members of the U.S. population. The data were collected during NFCS home interviews of 37,874 respondents, who were asked to recall food intake for the day preceding the interview, and record food intake the day of the interview and the day after the interview. Quantities consumed per eating occasion, are presented in Table 11-4.

The advantages of using these data are that they were derived from the USDA NFCS and are representative of the U.S. population. This data set provides distributions of serving sizes for a number of commonly eaten meat, poultry, and dairy products, but the list of foods is limited and does not account for meat, poultry, and dairy products included in complex food dishes. Also, these data are based on short-term dietary recall and may not accurately reflect long-term consumption patterns. Although these data are based on the NFCS 1977-78 survey, serving size data have been collected but not published for the more recent USDA surveys.



# 11.1.4. Relevant Meat and Dairy Products Intake Studies

The U.S. EPA's Dietary Risk Evaluation System (DRES) - U.S. EPA, Office of Pesticide Programs (OPP) -EPA OPP's DRES contains per capita intake rate data for various items of meat, poultry, and dairy products for 22 subgroups (age, regional, and seasonal) of the population. As described in Volume II, Chapter 9 - Fruits and Vegetables, intake data in DRES were generated by determining the composition of NFCS food items and disaggregating complex food dishes into their component raw agricultural commodities (RACs) (White et al. 1983). The DRES per capita, as consumed intake rates for all age/sex/demographic groups combined are presented in Table 11-5. These data are based on both consumers and non-consumers of these food items. Data for specific subgroups of the population are not presented in this section, but are available through OPP via direct request. The data in Table 11-5 may be useful for estimating the risks of exposure associated with the consumption of the various meat, poultry, and dairy products presented. It should be noted that these data are indexed to the actual body weights of the survey respondents and are expressed in units of grams of food consumed per kg body weight per day. Consequently, use of these data in calculating potential dose does not require the body weight factor in the denominator of the average daily dose (ADD) equation. It should also be noted that conversion of these intake rates into units of g/day by multiplying by a single average body weight is not appropriate because the DRES data base did not rely on a single body weight for all individuals. Instead, DRES used the body weights reported by each individual surveyed to estimate consumption in units of g/kg-day.

The advantages of using these data are that complex food dishes have been disaggregated to provide intake rates for a variety of meat, poultry, and dairy products. These data are also based on the individual body weights of the respondents. Therefore, the use of these data in calculating exposure to toxic chemicals may provide more representative estimates of potential dose per unit body weight. However, because the data are based on NFCS short-term dietary recall, the same limitations discussed previously for other NFCS data sets also apply here. In addition, consumption patterns may have changed since the data were collected in 1977-78. OPP is in the process of translating consumption information from the USDA CSFII 1989-91 survey to be used in DRES.

Food and Nutrient Intakes of Individuals in One Day in the U.S., USDA (1980, 1992) -USDA (1980; 1992)

calculated mean per capita intake rates for total meat, total poultry, and dairy products using NFCS data from 1977-78 and 1987-88. The mean intake rates for meat and dairy products are presented in Tables 11-6 and 11-7 for meats and Tables 11-8 and 11-9 for dairy for the two survey years. These values are based on intake data for one day for consumers and non-consumers from the 1977-78 and 1987-88 USDA NFCSs.

The advantages of using these data are that they provide mean intake estimates for all meat, poultry, and dairy products. The consumption estimates are based on short-term (i.e., 1-day) dietary data which may not reflect long-term consumption.

U.S. EPA - Office of Radiation Programs - The U.S. EPA Office of Radiation Programs (ORP) has also used the USDA 1977-1978 NFCS to estimate daily food intake. ORP uses food consumption data to assess human intake of radionuclides in foods (U.S. EPA, 1984a; 1984b). The 1977-1978 NFCS data have been reorganized by ORP, and food items have been classified according to the characteristics of radionuclide transport. The mean per capita dietary intake of food sub classes (milk, other dairy products, eggs, beef, pork, poultry, and other meat) grouped by age for the U.S. population is presented in Table 11-10. The mean daily intake rates of meat, poultry, and dairy products for the U.S. population grouped by regions are presented in Table 11-11. Because this study was based on the USDA NFCS, the limitations and advantages associated with the USDA NFCS data also apply to these data.

U.S. EPA - Office of Science and Technology - The U.S. EPA Office of Science and Technology (OST) within the Office of Water (formerly the Office of Water Regulations and Standards) used data from the FDA revision of the Total Diet Study Food Lists and Diets (Pennington, 1983) to calculate food intake rates. OST uses these consumption data in its risk assessment model for land application of municipal sludge. The FDA data used are based on the combined results of the USDA 1977-1978 NFCS and the second National Health and Nutrition Survey (NHANES II), Examination 1976-1980 (U.S. EPA, 1989). Because food items are listed as prepared complex foods in the FDA Total Diet Study, each item was broken down into its component parts so that the amount of raw commodities consumed could be determined. Table 11-12 presents intake rates for meat, poultry, and dairy products for various age groups. Estimated lifetime ingestion rates derived by U.S. EPA (1989) are also presented in Table 11-12. Note that these are per capita intake rates tabulated as grams dry weight/day. Therefore,

these rates differ from those in the previous tables because Pao et al. (1982) and U.S. EPA (1984a, 1984b) report intake rates on an as consumed basis.

The EPA-OST analysis provides intake rates for additional food categories and estimates of lifetime average daily intake on a per capita basis. In contrast to the other analyses of USDA NFCS data, this study reports the data in terms of dry weight intake rates. Thus, conversion is not required when contaminants are provided on a dry weight basis.

USDA (1993) - Food Consumption, Prices, and Expenditures, 1970-92 - The USDA's Economic Research Service (ERS) calculates the amount of food available for human consumption in the United States annually. Supply and utilization balance sheets were generated. These were based on the flow of food items from production to end uses. Total available supply was estimated as the sum of production (i.e., some products were measured at the farm level or during processing), starting inventories, and imports (USDA, 1993). The availability of food for human use commonly termed as "food disappearance" was determined by subtracting exported foods, products used in industries, farm inputs (seed and feed) and end-of-the year inventories from the total available supply (USDA, 1993). USDA (1993) calculated the per capita food consumption by dividing the total food disappearance by the total U.S. population.

USDA (1993) estimated per capita consumption data for meat, poultry, and dairy products from 1970-1992 (1992 data are preliminary). In this section, the 1991 values, which are the most recent final data, are presented. The meat consumption data were reported as carcass weight, retail weight equivalent, and boneless weight equivalent. The poultry consumption data were reported as ready-to-cook (RTC) weight, retail weight, and boneless weight (USDA, 1993). USDA (1993) defined beef carcass weight as the chilled hanging carcass, which includes the kidney and attached internal fat (kidney, pelvic, and heart fat), excludes the skin, head, feet, and unattached internal organs. The pork carcass weight includes the skin and feet, but excludes the kidney and attached internal fat. Retail weight equivalents assume all food was sold through retail foodstores; therefore, conversion factors (Table 11-13) were used to correct carcass or RTC to retail weight to account for trimming, shrinkage, or loss of meat and chicken at these retail outlets (USDA, 1993). Boneless equivalent values for meat (pork, veal, beef) and poultry excludes all bones, but includes separable fat sold on retail cuts of red meat. Pet food was considered as an apparent source of food disappearance for poultry in boneless weight estimates, while pet food was excluded for beef, veal, and pork (USDA, 1993). Table 11-13 presents per capita consumption in 1991 for red meat (carcass weight, retail equivalent, and boneless trimmed equivalent) and poultry (RTC, retail equivalent for chicken only, and boneless trimmed equivalent). Per capita consumption estimates based on boneless weights appear to be the most appropriate data for use in exposure assessments, because boneless meats are more representative of what people would actually consume. Table 11-14 presents per capita consumption in 1991 for dairy products including eggs, milk, cheese, cream, and sour cream.

One of the limitations of this study is that disappearance data do not account for losses from the food supply from waste, spoilage, or foods fed to pets. Thus, intake rates based on these data will overestimate daily consumption because they are based on the total quantity of marketable commodity utilized. Therefore, these data may be useful for estimating bounding exposure estimates. It should also be noted that per capita estimates based on food disappearance are not a direct measure of actual consumption or quantity ingested, instead the data are used as indicators of changes in usage over time (USDA, 1993). An advantage of this study is that it provides per capita consumption rates for meat, poultry, and dairy products which are representative of long-term intake because disappearance data are generated annually. Daily per capita intake rates are generated by dividing annual consumption by 365 days/year.

National Live Stock and Meat Board (1993) -Eating in America Today: A Dietary Pattern and Intake Report - The National Live Stock and Meat Board (1993) assessed the nutritional value of the current American diet based on two factors: (1) the composition of the foods consumed, and (2) the amount of food consumed. Data used in this study were provided by MRCA Information Services, Inc. through MRCA's Nutritional Marketing Information Division. The survey conducted by MRCA consisted of a 2,000 household panels of over 4,700 individuals. The survey sample was selected to be representative of the U.S. population. Information obtained from the survey by MRCA's Menu Census included food and beverage consumption over a period of 14 consecutive days. The head of the household recorded daily food and beverage consumption in-home and away-from-home in diaries for each household member. The survey period was from July 1, 1990 through June 30, 1991. This ensured that all days carried equal weights and provided a seasonally



balanced data set. In addition, nutrient intake data calculated by the MRCA's Nutrient Intake Database (NID) (based on the 1987-88 USDA Food Intake Study) and information on food attitudes were also collected. It should be noted, however, that the 14 daily diaries provide only the incidence of eating each food product by an individual, but not the quantity eaten by each person. The intake rate for each individual is estimated by multiplying the eating frequency of a particular food item by the average amount eaten per eating occasion. The data on the average amount eaten per eating occasion was obtained from the USDA NFCS survey.

Table 11-15 presents the adult daily mean intake of meat and poultry grouped by region and gender. The adult population was defined as consumers ages 19 and above (National Live Stock and Meat Board, 1993). Beef consumption was high in all regions compared to other meats and poultry (Table 11-15). The average daily consumption of meat in the U.S. was 114.2 g/day which included beef (57 percent), veal (0.5 percent), lamb (0.5 percent), game/variety meats (8 percent), processed meats (18 percent), and pork (16 percent) (National Live Stock and Meat Board, 1993). Table 11-16 shows the amount of meat consumed by the adult population grouped as non-meat eaters (1 percent), light meat eaters (30 percent), medium meat eaters (33 percent), and heavy meat eaters (36 percent).

The advantage of this study is that the survey period is longer (i.e., 14 days) than any other food consumption survey. The survey is also based on a nationally representative sample. The survey also accounts for foods eaten as mixtures. However, only mean values are provided. Therefore, distribution of long-term consumption patterns cannot be derived. In addition, the survey collects data on incidence of eating each food item and not actual consumption rates. This may introduce some bias in the results. The direction of this bias is unknown.

AIHC (1994) - Exposure Factors Sourcebook - The AIHC Sourcebook (AIHC, 1994) uses the data presented in the 1989 version of the Exposure Factors Handbook which reported data from the USDA 1977-78 NFCS. In this Handbook, new analyses of more recent data from the USDA 1989/91 CSFII are presented. Numbers, however, cannot be directly compared with previous values since the results from the new analysis are presented on a body weight basis.

The Sourcebook was selected as a relevant study because it was not the primary source for the data used to make recommendations in this document. However, it is an alternative information source. The advantage of using the CSFII and USDA NFCS data set instead, is they are the largest publicly available data source on food intake patterns in the United States. Data are available for a wide variety of meat, poultry, and dairy products and are intended to be representative of the U.S. population.

# 11.2. FAT CONTENT OF MEAT AND DAIRY PRODUCTS

In some cases, the residue levels of contaminants in meat and dairy products are reported as the concentration of contaminant per gram of fat. When using these residue levels, the assessor should ensure consistency in the exposure assessment calculations by using consumption rates that are based on the amount of fat consumed for the meat or dairy product of interest. Alternately, residue levels for the "as consumed" portions of these products may be estimated by multiplying the levels based on fat by the fraction of fat per product as follows:

$$\frac{residue\ level}{g-product} = \frac{residue\ level}{g-fat} \times \frac{g-fat}{g-product}$$
(Eqn. 11-1)

The resulting residue levels may then be used in conjunction with "as consumed" consumption rates. The percentages of lipid fat in meat and dairy products have been reported in various publications. USDA's Agricultural Handbook Number 8 (USDA, 1979-1984) provides composition data for agricultural products. It includes a listing of the total saturated, monounsaturated, and polyunsaturated fats for various meat and dairy items. Table 11-17 presents the total fat content for selected meat and dairy products taken from Handbook Number 8. The total percent fat content is based on the sum of saturated, monounsaturated, and polyunsaturated fats.

The National Livestock and Meat Board (NLMB) (1993) used data from Agricultural Handbook Number 8 and consumption data to estimate the fat contribution to the U.S. diet. Total fat content in grams, based on a 3-ounce (85.05 g) cooked serving size, was reported for several categories (retail composites) of meats. These data are presented in Table 11-18 along with the corresponding percent fat content values for each product. NLMB (1993) also reported that 0.17 grams of fat are consumed per gram of meat (i.e., beef, pork, lamb, veal, game, processed meats, and variety meats) (17 percent) and 0.08 grams of fat are consumed per gram of poultry (8 percent).

The average total fat content of the U.S. diet was reported to be 68.3 g/day. The meat group (meat, poultry, fish, dry beans, eggs, and nuts) was reported to contribute the most to the average total fat in the diet (41 percent) (NLMB, 1993). Meats (i.e., beef, pork, lamb, veal, game, processed meats, and variety meats) reportedly contribute less than 30 percent to the total fat of the average U.S. diet. The milk group contributes approximately 12 percent to the average total fat in the U.S. diet (NLMB, 1993). Fat intake rates and the contributions of the major food groups to fat intake for heavy, medium, and light meat eaters, and non meat eaters are presented in Table 11-19 (NLMB, 1993). NLMB (1993) also reported the average meat fat intake to be 19.4 g/day, with beef contributing about 50 percent of the fat to the diet from all meats. Processed meats contributed 31 percent; pork contributed 14 percent; game and variety meats contributed 4 percent; and lamb and veal contributed 1 percent to the average meat fat intake.

The Center for Disease Control (CDC) (1994) used data from NHANES III to calculate daily total food energy intake (TFEI), total dietary fat intake, and saturated fat intake for the U.S. population during 1988 to 1991. The sample population comprised 20,277 individuals ages 2 months and above, of which 14,001 respondents (73 percent response rate) provided dietary information based on a 24-hour recall. TFEI was defined as "all nutrients (i.e., protein, fat, carbohydrate, and alcohol) derived from consumption of foods and beverages (excluding plain drinking water) measured in kilocalories (kcal)." Total dietary fat intake was defined as "all fat (i.e., saturated and unsaturated) derived from consumption of foods and beverages measured in grams."

CDC (1994) estimated and provided data on the mean daily TFEI and the mean percentages of TFEI from total dietary fat grouped by age and gender. The overall mean daily TFEI was 2,095 kcal for the total population and 34 percent (or 82 g) of their TFEI was from total dietary fat (CDC, 1994). Based on this information, the mean daily fat intake was calculated for the various age groups and genders (see Appendix 11A for detailed calculation). Table 11-20 presents the grams of fat per day obtained from the daily consumption of foods and beverages grouped by age and gender for the U.S. population.

# 11.3. CONVERSION BETWEEN AS CONSUMED AND DRY WEIGHT INTAKE RATES

As noted previously, intake rates may be reported in terms of units as consumed or units of dry weight. It is essential that exposure assessors be aware of this difference so that they may ensure consistency between the units used for intake rates and those used for concentration data (i.e., if the unit of food consumption is grams dry weight/day, then the unit for the amount of pollutant in the food should be grams dry weight). If necessary, as consumed intake rates may be converted to dry weight intake rates using the moisture content percentages of meat, poultry and dairy products presented in Table 11-21 and the following equation:

$$IR_{dw} = Ir_{ac} * [(100-W)/100]$$
 (Eqn. 11-2)

Dry weight" intake rates may be converted to "as consumed" rates by using:

$$\begin{split} IR_{ac} &= IR_{dw}/[(100\text{-W})/100] & \text{(Eqn. 11-3)} \\ \text{where:} & & IR_{dw} &= \text{dry weight intake rate;} \\ & IR_{ac} &= \text{as consumed intake rate; and} \\ & W &= \text{percent water content.} \end{split}$$

#### 11.4. RECOMMENDATIONS

The CSFII data described in this section was used in selecting recommended meat, poultry, and dairy product intake rates for the general population and various subgroups of the United States population. The general design of both key and relevant studies are summarized in Table 11-22. The recommended values for intake of meat and dairy products are summarized in Table 11-23 and the confidence ratings for the recommended values for meat and dairy intake rates are presented in Table 11-24. Per capita intake rates for specific meat items, on a g/kg-day basis, may be obtained from Table 11-3. Percentiles of the intake rate distribution in the general population for total meat and total dairy, as well as per capita rates, are presented in Tables 11-1 and 11-2. From these tables, the mean and 95th percentile intake rates for meats are 2.1 g/kg-day and 5.1 g/kg-day, respectively. The mean and 95th percentile intake rates for dairy products are 8.0 g/kg-day and 29.7 g/kg-day. It is important to note that the distributions presented in Tables 11-1 through 11-3 are based on data collected over a 3-day period and may not necessarily reflect the long-term distribution of average daily intake rates. However, for these broad categories of food (i.e.,



total meats and total dairy products), because they may be eaten on a daily basis throughout the year with minimal seasonality, the short-term distribution may be a reasonable approximation of the long-term distribution, although it will display somewhat increased variability. This implies that the upper percentiles shown here will tend to overestimate the corresponding percentiles of the true long-term distribution. Intake rates for the homeproduced form of these food items/groups are presented in Volume II Chapter 12.

This section also presents recommendations for serving size for various meats and dairy products. These recommendations are based on the USDA NFCS 1977-78 data. The confidence rating for serving size recommendations are presented in Table 11-25. Percentiles of the serving size, as well as mean values, can be obtained from Table 11-4.

#### 11.5. REFERENCES FOR CHAPTER 11

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				Table 11	Table 11-1. Intake of Total Meats (g/kg-day)	Total Meats	(g/kg-day)						
Population	Percent												
Group	Consuming	Mean	SE	P1	P5	P10	P25	P50	P75	P90	P95	P99	P100
Total	96.4%	2.146	0.014	0	0.33	0.63	1.13	1.84	2.78	4.06	5.06	7.67	25.67
Age													
< 01	%2.99	2.867	0.187	0	0	0	0	2.34	4.72	6.52	8.56	11.52	25.67
01-02	92.6%	4.384	0.116	0	1.07	1.58	2.70	4.13	5.38	7.69	8.41	11.88	21.61
03-02	97.5%	3.873	0.092	0	1.12	1.38	2.21	3.50	5.04	6.64	8.23	11.25	15.00
06-11	%9'.26	3.011	0.052	0	99.0	1.02	1.80	2.78	3.98	5.12	80.9	8.38	11.68
12-19	97.7%	2.078	0.034	0	0.42	0.67	1.19	1.99	2.79	3.49	4.40	5.95	8.28
20-39	94.9%	1.923	0.019	0	0.39	0.64	1.09	1.73	2.54	3.49	4.14	5.46	8.37
40-69	97.3%	1.700	0.017	0	0.36	0.59	1.03	1.58	2.20	2.95	3.47	4.73	7.64
+ 02	97.1%	1.531	0.028	0	0.32	0.49	0.89	1.42	2.03	2.73	3.20	4.28	6.63
Season													
Fall	97.1%	2.182	0.029	0	0.37	99.0	1.15	1.85	2.80	4.11	5.16	8.06	25.67
Spring	95.8%	2.053	0.027	0	0.26	0.61	1.09	1.75	2.63	3.93	4.91	7.31	15.00
Summer	96.3%	2.178	0.031	0	0.35	0.63	1.11	1.86	2.84	4.10	5.18	7.86	18.19
Winter	96.4%	2.173	0.029	0	0.30	0.63	1.18	1.88	2.87	4.06	5.05	7.35	14.61
Ilrhanization													
Central City	%2 96	9 163	0.028	0	0.25	0.59	1 00	1 79	68 6	4 14	5 99	7 97	95.67
Nonmetropolitan	95.7%	2.168	0.028	0	0.30	0.63	1.15	1.90	2.79	4.04	5.12	7.69	14.61
Suburban	%9.96	2.126	0.021	0	0.39	0.64	1.13	1.84	2.74	4.03	4.94	7.31	15.00
f													
Kace													
Asian	89.3%	2.233	0.131	0	0	09.0	1.10	1.86	3.23	4.49	4.66	98.9	8.13
Black	95.5%	2.434	0.053	0	0.33	0.62	1.15	1.94	3.02	5.03	6.14	9.87	25.67
Native American	86.5%	2.269	0.131	0	0	0.41	1.32	1.87	3.38	4.64	5.09	7.32	8.57
Other/NA	95.1%	2.628	0.109	0	0	0.65	1.40	2.29	3.34	4.90	6.03	11.25	11.25
White	%6.96	2.083	0.015	0	0.34	0.63	1.12	1.81	2.72	3.87	4.87	7.18	18.19
Region													
Midwest	96.5%	2.204	0.029	0	0.44	0.69	1.21	1.85	2.82	4.08	5.05	7.86	21.61
Northeast	86.5%	2.148	0.033	0	0.35	0.67	1.16	1.89	2.75	3.98	4.99	8.27	15.00
South	%2'.96	2.249	0.025	0	0.37	0.68	1.18	1.90	2.88	4.35	5.34	7.73	13.42
West	95.8%	1.903	0.030	0	0.08	0.47	0.92	1.60	2.54	3.69	4.57	6.64	25.67
NOTE: SE = S	SF = Standard error												
P = Pe	P = Percentile of the distribution	ibution											
Source: Based on EPA's analyses of the 1989/91 CSFII	A's analyses of the	1989/91 CSFII											

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			Table 11-	Table 11-2. Intake of Total Dairy Products (g/kg-day)	f Total Dai	ry Product	s (g/kg-day	-					
Population	Percent												
Group	Consuming	Mean	SE	P1	P5	P10	P25	P50	P75	P90	P95	P99	P100
Total	97.1%	8.015	0.147	0	0.15	0.40	1.36	3.61	8.18	18.55	29.72	72.16	390.53
Age													
< 01	%9.68	62.735	2.800	0	0	0.61	24.68	45.78	91.12	136.6	170.86	210.72	390.53
01-02	95.6%	26.262	0.743	0	2.69	8.19	15.22	23.48	36.13	45.72	55.07	69.42	108.95
03-05	97.5%	21.149	0.517	0	3.27	6.75	11.89	19.52	28.31	39.54	44.16	57.58	62.88
06-11	97.4%	13.334	0.264	0	1.81	3.54	6.72	11.88	18.58	25.38	28.76	39.60	62.55
12-19	%6'.26	6.293	0.147	0	0.27	0.61	2.31	5.29	9.20	12.75	15.12	23.58	53.47
20-39	%6'.26	3.618	0.062	0	0.12	0.30	0.95	2.64	5.04	8.15	10.64	17.23	43.31
40-69	%6'96	3.098	0.053	0	0.10	0.26	0.94	2.23	4.36	66.9	9.05	12.99	34.42
+ 0.2	%9'.26	3.715	0.104	0	0.16	0.47	1.46	3.03	4.93	8.03	9.63	16.49	26.33
Season													
Fall	%1.7%	8.262	0.286	0	0.17	0.38	1.32	3.53	8.31	20.16	32.71	75.83	351.48
Spring	%8.96	8.273	0.335	0	0.13	0.39	1.37	3.50	7.88	18.02	27.02	116.00	390.53
Summer	%8.96	7.561	0.257	0	0.14	0.37	1.37	3.51	7.93	18.01	30.86	64.95	347.93
Winter	97.1%	7.964	0.293	0	0.16	0.43	1.39	3.90	8.77	17.60	27.34	63.27	307.54
Urbanization	-												
Central City	97.2%	8.528	0.309	0	0.17	0.41	1.4	3.78	8.05	18.25	29.51	106.93	318.93
Nonmetropolitan	itan 96.6%	7.224	0.261	0	0.10	0.28	1.08	3.34	7.82	17.28	24.70	59.17	390.53
Suburban	97.4%	8.058	0.209	0	0.17	0.43	1.42	3.61	8.45	19.50	32.04	69.42	351.48
Race													
Asian	94.0%	8.730	1.264	0	0	0.14	0.63	3.86	7.23	21.62	36.16	72.01	124.26
Black	94.8%	7.816	0.498	0	0.03	0.11	0.64	2.49	7.29	17.28	27.78	116.00	347.93
Native American	can 88.9%	6.987	1.057	0	0.02	0.14	0.81	2.83	8.06	20.20	24.17	66.71	139.37
Other/NA	97.1%	10.727	1.002	0	0.12	0.33	1.03	4.15	11.28	34.64	40.33	121.50	166.48
White	%L'.L6	7.943	0.156	0	0.22	0.49	1.50	3.76	8.24	18.16	28.76	66.11	390.53
Region													
Midwest	97.3%	9.291	0.341	0	0.20	0.50	1.66	4.20	9.61	21.33	34.35	88.06	390.53
Northeast	97.2%	7.890	0.330	0	0.18	0.42	1.42	3.41	7.54	18.07	32.04	78.15	307.54
South	97.3%	6.926	0.225	0	0.11	0.27	1.01	3.10	7.49	15.86	25.76	54.94	347.93
West	%2'96	8.454	0.313	0	0.17	0.49	1.60	3.93	8.67	19.88	29.89	84.46	174.65
NOTE: S	SE = Standard error P = Percentile of the distribution	ribution											
Source: Base	Source: Based on EPA's analyses of th	the 1989/91 CSFII											

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		Tabl	e 11-3. Inta	Table 11-3. Intake of Individual Meat and Dairy Products and Mixtures (g/kg-day)	al Meat an	d Dairy Pi	roducts and M	lixtures (g/	kg-day)			
		Beef			Pork		I	Poultry			Game	
Population Group	Percent Consuming	Mean	SE	Percent Consuming	Mean	SE	Percent Consuming	Mean	SE	Percent Consuming	Mean	SE
Total	91.5%	0.825	0.007	90.2%	0.261	0.005	91.7%	0.598	0.007	1.2%	0.010	0.010
Age												
< 01	63.7%	0.941	0.075	63.0%	0.291	0.040	64.9%	0.816	0.087	0.5%	0.014	0.091
01-02	93.1%	1.460	0.056	92.4%	0.492	0.041	94.2%	1.156	0.064	%6.0	0.026	0.125
03-05	94.9%	1.392	0.050	%0.56	0.473	0.035	95.0%	1.068	0.049	1.5%	0.010	0.040
06-11	95.4%	1.095	0.028	94.5%	0.352	0.018	95.7%	0.871	0.028	1.1%	0.004	0.016
12-19	95.4%	0.830	0.020	94.0%	0.270	0.013	94.3%	0.558	0.017	1.0%	0.004	0.019
20-39	93.9%	0.789	0.012	92.5%	0.230	0.007	94.6%	0.530	0.010	1.3%	0.010	0.021
40-69	90.1%	0.667	0.011	88.3%	0.212	0.007	90.5%	0.477	0.010	1.3%	0.012	0.017
70 +	87.4%	0.568	0.018	86.5%	0.207	0.011	86.7%	0.463	0.017	1.1%	0.002	0.010
Season												
Fall	92.4%	0.834	0.014	91.9%	0.254	0.008	92.9%	0.635	0.015	1.7%	0.016	0.022
Spring	%8'06	0.797	0.014	88.8%	0.264	0.009	91.0%	0.538	0.013	0.7%	9000	0.019
Summer	90.5%	0.845	0.017	89.4%	0.245	0.010	90.4%	0.625	0.015	0.7%	0.003	0.012
Winter	92.1%	0.823	0.015	%9.06	0.279	0.009	92.6%	0.595	0.014	1.6%	0.013	0.021
Urbanization												
Central City	8.06	0.808	0.013	89.5%	0.258	0.009	91.7%	0.627	0.014	0.7%	0.005	0.014
Nonmetropolitan	%8'06	0.841	0.015	90.3%	0.299	0.010	%9.06	0.540	0.013	2.0%	0.019	0.018
Suburban	92.3%	0.828	0.011	%9.06	0.244	90000	92.4%	0.608	0.011	1.1%	0.008	0.018
Race												
Asian	88.6%	0.895	0.072	85.9%	0.256	0.049	88.6%	0.790	0.068	0.0%	0	0
Black	86.5%	0.665	0.019	89.2%	0.418	0.019	91.9%	0.798	0.025	0.1%	0.001	0.027
Native American	81.9%	0.995	0.088	83.6%	0.188	0.024	80.7%	0.540	0.051	0.6%	0.001	0.012
Other/NA	90.3%	1.159	0.069	88.3%	0.191	0.021	91.7%	0.810	0.049	0.3%	0.003	0.046
White	92.6%	0.833	0.008	%9.06	0.241	0.005	92.0%	0.559	0.007	1.4%	0.011	0.011
Region												
Midwest	92.3%	0.853	0.015	91.3%	0.284	0.009	91.7%	0.551	0.014	2.2%	0.012	0.012
Northeast	92.5%	0.805	0.017	90.4%	0.236	0.010	92.7%	0.651	0.017	0.5%	0.005	0.026
South	90.2%	0.846	0.013	89.5%	0.283	0.008	91.7%	0.643	0.012	0.8%	0.009	0.025
West	91.7%	0.775	0.016	%/:68	0.220	0.006	91.0%	0.526	0.014	1.3%	0.012	0.022





	Table 11-3	Intake of Ind	ividual Meat a	Table 11-3. Intake of Individual Meat and Dairy Products and Mixtures (g/kg-day) (continued)	and Mixtures	(g/kg-day)	continued)		
		Eggs		Mea	Meat Mixtures		Grai	Grain Mixtures	
Population Group	Percent Consuming <sup>a</sup>	Mean	SE	Percent Consuming <sup>a</sup>	Mean	SE	Percent Consuming <sup>a</sup>	Mean	SE
Total Age	41.4%	0.317	0.009	67.1%	1.602	0.024	57.3%	1.719	0.033
< 01	32.3%	0.791	0.126	42.9%	2.431	0.336	44.1%	3.465	0.429
01-02	43.3%	0.822	0.087	65.1%	3.194	0.227	69.1%	4.710	0.326
03-05	39.6%	0.677	0.088	%8.99	2.734	0.155	74.0%	4.195	0.223
06-11	36.6%	0.414	0.033	70.2%	2.155	0.093	75.1%	2.820	0.109
12-19	36.0%	0.244	0.023	71.0%	1.523	0.062	71.2%	2.066	0.079
20-39	43.3%	0.271	0.012	69.3%	1.519	0.036	63.0%	1.476	0.040
40-69	44.0%	0.225	0.009	%2'99	1.222	0.031	44.6%	0.862	0.034
+ 02	42.0%	0.218	0.017	64.3%	1.130	0.056	34.4%	0.682	0.063
Season									
Fall	40.1%	0.291	0.017	70.5%	1.875	0.049	58.2%	1.775	0.065
Spring	42.7%	0.307	0.017	64.3%	1.384	0.045	26.9%	1.687	0.068
Summer	40.5%	0.344	0.020	63.7%	1.403	0.044	56.5%	1.741	0.071
Winter <b>Urbanization</b>	42.2%	0.325	0.019	%0.02	1.745	0.054	57.4%	1.672	0.063
Central City	41.6%	0.315	0.018	63.8%	1.516	0.044	56.1%	1.625	0.055
Nonmetropolitan	43.8%	0.338	0.018	%8.89	1.693	0.047	54.5%	1.591	0.063
Suburban <b>Race</b>	39.7%	0.309	0.013	88.5%	1.613	0.036	29.8%	1.839	0.054
Asian	38.9%	0.452	0.094	68.5%	1.670	0.225	27.0%	2.633	0.426
Black	48.9%	0.385	0.023	65.2%	1.560	0.068	47.7%	1.493	0.097
Native American	49.7%	0.491	0.170	%8'02	2.076	0.247	52.6%	1.947	0.320
Other/NA	55.1%	0.472	0.056	58.6%	2.196	0.229	64.9%	2.490	0.228
White <b>Region</b>	39.5%	0.297	0.010	%1.7%	1.579	0.026	58.7%	1.708	0.036
Midwest	36.9%	0.288	0.019	%2.69	1.816	0.052	%8'09	1.713	090.0
Northeast	35.9%	0.264	0.020	66.2%	1.461	0.056	59.2%	1.915	0.085
South	44.3%	0.325	0.014	%6.99	1.564	0.039	52.0%	1.590	0.057
West	46.6%	0.392	0.022	65.4%	1.552	0.051	%2'09	1.746	0.072
<sup>a</sup> Upper bound on percent consuming (see text)  NOTE: SE = Standard error  P = Percentile of the distribution  Source: Rased on FDA's analyses of the 1980/01 CSFII	and on percent consuming (see text) SE = Standard error P = Percentile of the distribution	(see text) ribution	SEII						
Double, Dasea on Li	1 S allalyses of	TIE 1200/ 01 ~	тле						

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Food category In South Consister In	and the retremage of marylands Osing These rooms in 3 Days			
Average Standard 5 25 5 5 Deviation  84.6 107 85 16 46  67.3 133 85 41 84 11  1.5 146 84 43 88 16  1.5 146 84 43 88 11  1.5 146 84 43 88 11  1.5 148 77 42 84 11  1.5 148 77 42 84 11  1.5 148 11	Consumers-only Quantity consumed per eating occasion at Specified Percentiles (g)	ıly at Specified Perce	ntiles (g)	
84.6 107 85 16 46 67.3 133 85 41 84 11 49.9 69 69 8 16 1.5 146 84 43 88 11  1.3 130 71 42 84 11  1.3 128 77 42 82 11  1.5 105 73 28 57  1.6 148 41 40 50  1.7 131 11 11 2 5  1.8 1.3 131 11 2 5  1.9 105 1131 11 2 5  1.9 105 1131 11 2 5  1.9 105 1131 11 11 11 11 11 11 11 11 11 11 11 1		06	95	66
67.3 133 85 41 84 49.9 69 69 8 16 1.5 146 84 43 88 1.5 130 71 42 84 1.5 130 71 42 84 1.5 131 76 42 82 1.5 131 76 43 84 1.5 131 76 43 84 1.5 131 82 57 1.6 12 13 13 55 1.7 12 13 13 55 1.8 12 13 55 1.9 12 13 55 1.9 12 13 55 1.9 12 13 55 1.9 12 13 55 1.9 12 13 14 15 1.1 11 11 2 15 1.9 12 12 1.9 14 15 12 1.9 14 15 1.9 1		224	252	432
1.5 146 69 69 8 16  1.5 146 84 43 88  2.3 130 71 42 84  n 38.7 131 76 42 82  Products  5.8 105 73 28 57  Inne 43.1 11 11 2 5  1. beef, pork, lamb, and yeal.  1. beef, pork, lamb, and veal.		224	280	448
1.5 146 84 43 88  2.3 130 71 42 84  n 38.7 131 76 42 82  n 38.7 131 76 43 84  Products  5.8 105 73 28 57  ine 43.1 12 13 2 55  ine 40 41 28 15  c 40 41 28 14  c 40 50  c 40 41 28 15  c 40 41 28 14  c 40 42 56  c 40 41 28 14  c 40 42 56  c 40 41 28 14  c 40 42 56  c 40 41 28 14  c 40 42 56  c 40 41 28 14  c 40 42 56  c 40 41 28 14  c 40 42 56  c 40 41 28 14  c 40 42 56  c 40 41 28  c 4		160	194	320
2.3 130 71 42 84 11  n 42.8 128 77 42 82 11  n 38.7 131 76 43 84 11  Products  54.3 82 44 40 50  ine 43.1 11 11 2 5 5  ine 40 41 28 14 28  1- beef, port, lamb, and yeal.  1- beef, port, lamb, and veal.		227	280	448
n 38.7 128 77 42 82 1 n 38.7 131 76 43 84 1 Products  54.3 82 44 40 50  ine 43.1 11 11 2 5  ine 40 41 28 5  ine 40 41 28 12 28  ine 40 41 28 12 28  ine 40 41 28 12 28		224	276	352
131   76   43   84   1   1   1   1   1   1   1   1   1		224	280	388
Products 54.3 82 44 40 50 all 4 12 13 2 5 and a lib hoxerage and milk hoxerage and m		224	280	388
Products  54.3 82 44 40 50  31.4 12 13 2 5  rine 43.1 11 11 2 5  82.5 203 134 15 122 2  1- beef, pork, lamb, and yeal.		172	240	350
ine 43.1 12 13 2 5 5 7 14 40 50 50 31.4 12 13 2 5 5 5 7 14 11 11 2 5 5 5 5 7 14 14 15 12 2 5 5 7 12				
ine 43.1 12 13 2 5  rine 43.1 11 11 2 5  82.5 203 134 15 122 2  - beef, pork, lamb, and veal.  - the bear pork, lamb, and veal.		128	150	237
ine 43.1 11 11 2 5  82.5 203 134 15 122 2		28	28	57
82.5 203 134 15 122 2  40 41 28 14 28  1- beef, pork, lamb, and veal.		28	28	57
28 14 28		366	488	552
<sup>a</sup> Meat - beef, pork, lamb, and veal. <sup>b</sup> Milt fluid milt. howarases and milt. based infant formulas		58	85	140
Cheese - natural and processed cheese.				

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	for Meat, Poultry, and Dairy Products (g/Kg-d ex/Age/Demographic Subgroups	as consumed)
	Average Consumption (Grams/kg	
Raw Agricultural Commodity <sup>a</sup>	Body Weight/Day)	Standard Error
Milk-Non-Fat Solids	0.9033354	0.0134468
Milk-Non-Fat Solids (Food additive)	0.9033354	0.0134468
Milk-Fat Solids	0.4297199	0.0060264
Milk-Fat Solids (Food additive)	0.4297199	0.0060264
Milk Sugar (Lactose)	0.0374270	0.0033996
Beef-Meat Byproducts	0.0176621	0.0005652
Beef (Organ Meats) - Other	0.0060345	0.0007012
Beef - Dried	0.0025325	0.0004123
Beef (Boneless) - Fat (Beef Tallow)	0.3720755	0.0048605
Beef (Organ Meats) - Kidney	0.0004798	0.0003059
Beef (Organ Meats) - Liver	0.0206980	0.0014002
Beef (Boneless) - Lean (w/o Removeable Fat)	1.1619987	0.0159453
Goat-Meat Byproducts	0.000000	NA
Goat (Organ Meats) - Other	0.000000	NA o occopan
Goat (Boneless) - Fat	0.000397	0.0000238
Goat (Organ Meats) - Kidney	0.000000	NA NA
Goat (Organ Meats) - Liver	0.000000	NA 0.0001139
Goat (Boneless) - Lean (w/o Removeable Fat) Horse	0.0001891	0.0001139 NA
Rabbit	0.000000	0.00003544
Sheep - Meat Byproducts	$0.0014207 \\ 0.0000501$	0.00003344
Sheep (Organ Meats) - Other	0.0000301	0.0000381
Sheep (Boneless) - Fat	0.0042966	0.0005956
Sheep (Organ Meats) - Kidney	0.00042300	0.0003330
Sheep (Organ Meats) - Liver	0.000000	NA
Sheep (Boneless) - Lean (w/o Removeable Fat)	0.0124842	0.0015077
Pork - Meat Byproducts	0.0250792	0.0022720
Pork (Organ Meats) - Other	0.0038496	0.0003233
Pork (Boneless) - Fat (Including Lard)	0.2082022	0.0032032
Pork (Organ Meats) - Kidney	0.0000168	0.0000106
Pork (Organ Meats) - Liver	0.0048194	0.0004288
Pork (Boneless) - Lean (w/o Removeable Fat)	0.3912467	0.0060683
Meat, Game	0.0063507	0.0010935
Turkey - Byproducts	0.0002358	0.0000339
Turkey - Giblets (Liver)	0.0000537	0.0000370
Turkey - Flesh (w/o Skin, w/o Bones)	0.0078728	0.0007933
Turkey - Flesh (+ Skin, w/o Bones)	0.0481655	0.0026028
Turkey - Unspecified	0.0000954	0.0000552
Poultry, Other - Byproducts	0.0000000	NA
Poultry, Other - Giblets (Liver)	0.0002321	0.0001440
Poultry, Other - Flesh (+ Skin, w/o Bones)	0.0053882	0.0007590
Eggs - Whole	0.5645020	0.0076651
Eggs - White Only Eggs - Yolk Only	0.0092044	0.0004441
	0.0066323	0.0004295
Chicken - Byproducts	0.000000	NA
Chicken - Giblets (Liver)	0.0050626	0.0005727
Chicken - Flesh (w/o Skin, w/o Bones)	0.0601361	0.0021616
Chicken - Flesh (+ Skin, w/o Bones)	0.3793205	0.0104779
NA = Not applicable		
<sup>a</sup> Consumed in any raw or prepared form.		
Source: DRES database		



Group Age (yrs.)	Total Meat, Poultry and Fish	Beef	Pork	Lamb, Veal, Game	Frankfurters, Sausages, Luncheon Meats, Spreads	Total Poultry	Chicken Only	Meat Mixtures <sup>c</sup>
Males and Females								
1 and Under	72	9	4	3	2	4	1	51
1-2	91	18	6	(b)	15	16	13	32
3-5	121	23	8	(b)	15	19	19	49
6-8	149	33	15	1	17	20	19	55
<u>Males</u>								
9-11	188	41	22	3	19	24	21	71
12-14	218	53	18	(b)	25	27	24	87
15-18	272	82	24	1	25	37	32	93
19-22	310	90	21	2	33	45	43	112
23-34	285	86	27	1	30	31	29	94
35-50	295	75	28	1	26	31	28	113
51-64	274	70	32	1	29	31	29	86
65-74	231	54	25	2	22	29	26	72
75 and Over	196	41	39	7	19	28	25	54
<u>Females</u>								
9-11	162	38	17	1	20	27	23	55
12-14	176	47	19	1	18	23	22	61
15-18	180	46	14	2	16	28	27	61
19-22	184	52	19	1	18	26	24	61
23-34	183	48	17	1	16	24	22	66
35-50	187	49	19	2	14	24	21	63
51-64	187	52	19	2	12	26	24	60
65-74	159	34	21	4	12	30	25	47
75 and Over	134	31	17	2	9	19	16	49
Males and Females								
All Ages	207	54	20	2	20	27	24	72

 $<sup>^{\</sup>rm a}$  Based on USDA Nationwide Food Consumption Survey (1977-1978) data for one day. Less than 0.5 g but more than 0.

Table 1	1-7. Mean Meat In	takes per	Individual	in a Day by S	Sex and Age (g/day as	consumed) <sup>a</sup> f	or 1987-1988	
Group Age (yrs.)	Total Meat, Poultry, and Fish	Beef	Pork	Lamb, Veal, Game	Frankfurters, Sausages, Luncheon Meats	Total Poultry	Chicken Only	Meat Mixturess <sup>b</sup>
Males and Females								
5 and Under	92	10	9	< 0.5	11	14	12	39
Males								
6-11	156	22	14	< 0.5	13	27	24	74
12-19	252	38	17	1	20	27	20	142
20 and over	250	44	19	23	2	31	25	108
Females								
6-11	151	26	9	1	11	20	17	74
12-19	169	31	10	< 0.5	18	17	13	80
20 and over	170	29	12	1	13	24	18	73
All individuals	193	32	14	1	17	26	20	86

 $<sup>^{\</sup>rm a}$  Based on USDA Nationwide Food Consumption Survey (1987 to 1988) data for one day.  $^{\rm b}$  Includes mixtures containing meat, poultry, or fish as a main ingredient.

<sup>&</sup>lt;sup>c</sup> Includes mixtures containing meat, poultry, or fish as a main ingredient. Source: USDA, 1980.

Source: USDA, 1992.



Group Age (yrs.)	Total Milk	Fluid Milk	Cheese	Eggs
1 and Under	618	361	1	5
1-2	404	397	8	20
3-5	353	330	9	22
6-8	433	401	10	18
<b>)</b> -11	432	402	8	26
12-14	504	461	9	28
15-18	519	467	13	31
19-22	388	353	15	32
23-34	243	213	21	38
35-50	203	192	18	41
51-64	180	173	17	36
35-74	217	204	14	36
5 and Over	193	184	18	41
9-11	402	371	7	14
12-14	387	343	11	19
15-18	316	279	11	21
19-22	224	205	18	26
23-34	182	158	19	26
35-50	130	117	18	23
51-64	139	128	19	24
65-74	166	156	14	22
75 and Over	214	205	20	19
All Ages	266	242	15	27

 $<sup>^{\</sup>rm a}$  Based on USDA Nationwide Food Consumption Survey (1977-1978) data for one day. Source: USDA, 1980.

Table 11-9. M	Iean Dairy Product Intakes per In	dividual in a Day, by	y Sex and Age (g/day as co	onsumed) <sup>a</sup> for 1987	′-1988
Group Age (yrs.)	Total Fluid Milk	Whole Milk	Lowfat/Skim Milk	Cheese	Eggs
Males and Females					
5 and under	347	177	129	7	11
Males					
6-11	439	224	159	10	17
12-19	392	183	168	12	17
20 and over	202	88	94	17	27
Females					
6-11	310	135	135	9	14
12-19	260	124	114	12	18
20 and over	148	55	81	15	17
All inividuals	224	99	102	14	20

 $<sup>^{\</sup>rm a}$  Based on USDA Nationwide Food Consumption Survey (1987 to 1988) data for one day. Source: USDA, 1992.

		01 1 000 50	o classes per cup	ita by Age (g/day a	us consumeu)		
Age (yrs.)	Fresh Cows' Milk	Other Dairy Products	Eggs	Beef	Pork	Poultry	Other Meat
All Ages	$253.5 \pm 4.9$	$55.1 \pm 1.2$	$26.9 \pm 0.5$	$87.6 \pm 1.1$	$28.2 \pm 0.6$	$31.3 \pm 0.8$	$25.1 \pm 0.4$
< 1	$272.0 \pm 31.9$	$296.7 \pm 7.6$	$4.9 \pm 3.2$	$18.4 \pm 7.4$	$5.8 \pm 3.6$	$18.4 \pm 4.9$	$2.6 \pm 2.8$
1-4	$337.3 \pm 15.6$	$41.0 \pm 3.7$	$19.8 \pm 1.6$	$42.2 \pm 3.7$	$13.6 \pm 1.8$	$19.0 \pm 2.4$	$17.6 \pm 1.4$
5-9	$446.2 \pm 13.1$	$47.3 \pm 3.1$	$17.0 \pm 1.3$	$63.4 \pm 3.1$	$18.2 \pm 1.5$	$24.7 \pm 2.0$	$22.3 \pm 1.2$
10-14	$456.0 \pm 12.3$	$53.3 \pm 2.9$	$19.3 \pm 1.2$	$81.9 \pm 2.9$	$22.2 \pm 1.4$	$30.0 \pm 1.9$	$26.1 \pm 1.1$
15-19	$404.8 \pm 12.9$	$52.9 \pm 3.1$	$24.8 \pm 1.3$	$99.5 \pm 3.0$	$29.5 \pm 1.5$	$33.0 \pm 2.0$	$27.6 \pm 1.1$
20-24	$264.3 \pm 16.4$	$44.2 \pm 4.0$	$28.3 \pm 1.7$	$103.7 \pm 3.9$	$29.6 \pm 1.9$	$33.0 \pm 2.6$	$28.8 \pm 1.5$
25-29	$217.6 \pm 17.2$	$51.5 \pm 4.1$	$27.9 \pm 1.7$	$103.8 \pm 4.0$	$31.8 \pm 2.0$	$33.8 \pm 2.7$	$28.9 \pm 1.5$
30-39	$182.9 \pm 13.5$	$53.8 \pm 3.2$	$30.1 \pm 1.4$	$105.8 \pm 3.2$	$33.0 \pm 1.5$	$34.0 \pm 2.1$	$28.4 \pm 1.2$
40-59	$169.1 \pm 10.5$	$52.0 \pm 2.5$	$31.1 \pm 1.0$	$99.0 \pm 2.5$	$33.5 \pm 1.2$	$33.8 \pm 1.6$	$27.4 \pm 0.9$
≥60	$192.4 \pm 11.8$	$55.9 \pm 2.8$	$28.7 \pm 1.2$	$74.3 \pm 2.8$	$27.5 \pm 1.3$	$31.5 \pm 1.8$	$21.1 \pm 1.0$

Table 11-11. Mean an	Table 11-11. Mean and Standard Error for the Daily Intake of Food Class and Sub Class by Region (g/day as consumed)				
	US Population	Northeast	North Central	South	West
Dairy Products (Total) Fresh Cows Milk Other Eggs Meats (Total) Beef and Veal Pork Poultry Other	$308.6 \pm 5.3$ $253.5 \pm 4.9$ $55.1 \pm 1.2$ $26.9 \pm 0.5$ $172.2 \pm 1.6$ $87.6 \pm 1.1$ $28.2 \pm 0.6$ $31.3 \pm 0.8$ $25.1 \pm 0.4$	$\begin{array}{c} 318.6 \pm \ 10.4 \\ 256.1 \pm \ 9.7 \\ 62.5 \pm \ 2.3 \\ 23.8 \pm \ 1.0 \\ 169.9 \pm \ 3.3 \\ 82.3 \pm \ 2.3 \\ 28.8 \pm \ 1.1 \\ 31.7 \pm \ 1.5 \\ 27.1 \pm \ 0.9 \end{array}$	$336.1 \pm 10.0$ $279.7 \pm 9.4$ $56.5 \pm 2.2$ $23.5 \pm 0.9$ $176.9 \pm 3.1$ $92.9 \pm 2.2$ $29.6 \pm 1.1$ $26.6 \pm 1.4$ $27.8 \pm 0.8$	$\begin{array}{c} 253.6 \pm 8.4 \\ 211.0 \pm 7.8 \\ 42.6 \pm 1.9 \\ 31.0 \pm 0.8 \\ 171.9 \pm 2.6 \\ 84.0 \pm 1.8 \\ 30.1 \pm 0.9 \\ 36.5 \pm 1.2 \\ 21.3 \pm 0.7 \end{array}$	$348.1 \pm 12.3$ $283.5 \pm 11.5$ $64.6 \pm 2.7$ $29.1 \pm 1.2$ $168.6 \pm 3.9$ $92.9 \pm 2.7$ $22.1 \pm 1.3$ $28.9 \pm 1.8$ $24.7 \pm 1.0$

NOTE: Northeast = Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, and Pennsylvania.

North Central = Ohio, Illinois, Indiana, Wisconsin, Michigan, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas

South = Maryland, Delaware, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Texas, and Oklahoma.

West = Montana, Idaho, Wyoming, Utah, Colorado, New Mexico, Arizona, Nevada, Washington, Oregon, and California.

Source: U.S. EPA, 1984b.



Table 11-12. Consumption of Meat, Poultry, and Dairy Products for Different Age Groups (averaged across sex), and

	Estimated Lifetime Average Intakes for 70 Kg Adult Citizens Calculated from the FDA Diet Data.						
Produce	Baby (0-1 yrs)	Toddler 1-6 yrs)	Child (6-14 yrs)	Teen (14-20 yrs)	Adult (20-45 yrs)	Old (45-70 yrs)	Estimated Lifetime Intake <sup>a</sup>
				g - dry weight/day			
Beef	3.99	9.66	15.64	21.62	23.28	18.34	19.25
Beef Liver	0.17	0.24	0.30	0.36	1.08	1.2	0.89
Lamb	0.14	0.08	0.06	0.05	0.30	0.21	0.20
Pork	1.34	4.29	6.57	8.86	10.27	9.94	9.05
Poultry	2.27	3.76	5.39	7.03	7.64	6.87	6.70
Dairy	40.70	32.94	38.23	43.52	27.52	22.41	28.87
Eggs	3.27	6.91	7.22	7.52	8.35	9.33	8.32
Beef Fat	2.45	6.48	11.34	16.22	20.40	14.07	15.50
Beef Liver Fat	0.05	0.07	0.08	0.10	0.29	0.33	0.25
Lamb Fat	0.14	0.08	0.07	0.06	0.31	0.22	0.21
Dairy Fat	38.99	16.48	20.46	24.43	18.97	14.51	18.13
Pork Fat	2.01	8.19	10.47	12.75	14.48	13.04	12.73
Poultry Fat	1.10	0.83	1.12	1.41	1.54	1.31	1.34

 $<sup>^{\</sup>rm a}$  The estimated lifetime dietary intakes were estimated by:

Estimated lifetime intake = CR(0.1) + 5yrs \* CR (1-5) + 8 yrs \* CR (6-13) + 6 yrs \* CR (14-19) + 25 yrs \* CR (20-44) + 25 yrs \* CR (45-70)

where CR = the consumption rate for a specific age group.

Source: U.S. EPA, 1989.

	Per Capita Consumption	Per Capita	Per Capita Consumption Retail Cut	Per Capita Consumption Boneless
	Carcass <sup>b</sup> Weight	Consumption RTC <sup>c</sup>	Equivalent <sup>d</sup>	Trimmed Equivalent <sup>e</sup>
Food Item	(g/day) <sup>f</sup>	(g/day) <sup>f</sup>	(g/day) <sup>f</sup>	(g/day) <sup>f</sup>
Red Meat				
Beef	118.3		82.8	78.4
Veal	1.5		1.2	0.99
Pork	8.0		62.1	58.3
Lamb and Mutton	2.0		1.7	1.2
Total <sup>g</sup>	201.7		147.9	139.1
Poultry				
Young Chicken			78.3	
Other Chicken			1.7	
Chicken		91.3		54.5 <sup>h,i</sup>
Turkey		22.2		17.5 <sup>h</sup>
Total <sup>g</sup>		109.2	77.0	72.1

- Includes processed meats and poultry in a fresh basis; excludes shipments to U.S. territories; uses U.S. total population, July 1, and does not include residents of
- Beef-Carcass-Weight is the weight of the chilled hanging carcass, which includes the kidney and attached internal fat [kidney, pelvic, and heart fat (kph)] but not head, feet, and unattached internal organs. Definitions of carcass weight for other red meats differ slightly.
- RTC ready-to-cook poultry weight is the entire dressed bird which includes bones, skin, fat, liver, heart, gizzard, and neck.
- Retail equivalents in 1991 were converted from carcass weight by multiplying by a factor of 0.7, 0.83, 0.89, and 0.776 for beef, veal, lamb, and pork, respectively; 0.877 was the factor used each for young chicken and other chicken.
- Boneless equivalent for red meat derived from carcass weight in 1991 by using conversion factors of 0.663, 0.685, 0.658 and 0.729 for beef, veal, lamb, and pork, respectively; 0.597, 0.597 and 0.790 were the factors used for young chicken, other chicken, and turkey.
- Original data were presented in lbs; converted to g/day by multiplying by a factor of 453.6 g/lb and dividing by 365 days/yr.
- Computed from unrounded data.
- Includes skin, neck, and giblets.
- Excludes amount of RTC chicken going to pet food as well as some water leakage that occurs when chicken is cut-up before packaging.



Tabl	e 11-14. Per Capita Consum	ption of Dairy Products in 1991 <sup>a</sup>	
Food Item	Per Capita Consumption (g/day) <sup>j</sup>	Food Item	Per Capita Consumption (g/day) <sup>j</sup>
<u>Eggs</u>		Cheese	
Farm Weight <sup>b,e</sup>	37.8	American	
Retail Weight <sup>c,e</sup>	37.3	Cheddar	11.2
8		$Other^{^{\mathrm{d}}}$	2.5
Fluid Milk and Cream	289.7	Italian	
Plain Whole Milk	105.3	Provolone	0.8
Lowfat Plain Milk (2%)	98.1	Romano	0.2
Lowfat Plain Milk (1%)	25.8	Parmesan	0.6
Skim Plain Milk	29.7	Mozzarella	9.0
Whole Flavored Milk and Drink	3.4	Ricotta	1.0
Lowfat Flavored Milk and Drink	8.5	Other	0.07
Buttermilk (lowfat and skim)	4.2	Miscellaneous	
Half and Half Cream	3.9	Swiss <sup>f</sup>	1.5
Light Cream	0.4	Brick	0.07
Heavy Cream	1.6	Muenster	0.5
Sour Cream	3.2	Cream	1.9
Eggnog	0.5	Neufchatel	0.3
88 8		$Blue^g$	0.2
Evaporated and Condensed Milki		Other	1.2
Canned Whole Milk	2.6	Processed Products	
Bulk Whole Milk	1.4	Cheese	6.1
Bulk and Canned Skim Milk	6.2	Foods and spreads	4.7
Totale	10.2	Cheese Content	8.5
		Consumed as Natural	22.6
Dry Milk Products <sup>i</sup>		Cottage Cheese (lowfat)	1.6
Dry Whole Milk	0.5	1	
Nonfat Dry Milk	3.2	Frozen Dairy Products	
Dry Buttermilk	0.3	Ice Cream	20.3
Totale	4.0	Ice Milk	9.2
Dried Whey	4.5	Sherbet	1.5
<del></del>		Other Frozen Products <sup>h</sup>	5.3
<u>Butter</u>	5.2	Total <sup>e</sup>	36.4
		All Diary Products	
		USDA Donations	17.1
		Commercial Sales	685.2
		Total	702.4

All per capita consumption figures use U.S. total populations, except fluid milk and cream data, which are based on U.S. residential population. For eggs, excludes shipments to U.S. territories, uses U.S. total population, July 1, which does not include U.S. territories.
 A dozen eggs converted at 1.57 pounds.

The factor for converting farm weight to retail weight was 0.97 in 1960 and was increased 0.003 per year until 0.985 was reached in 1990.

<sup>&</sup>lt;sup>d</sup> Includes Colby, washed curd, Monterey, and Jack.

<sup>&</sup>lt;sup>e</sup> Computed from unrounded data.

f Includes imports of Gruyere and Emmenthaler.

g Includes Gorgonzola.

<sup>&</sup>lt;sup>h</sup> Includes mellorine, frozen yogurt beginning 1981, and other nonstandardized frozen diary products.

Includes quantities used in other dairy products.

Joriginal data were presented in lbs, conversions to g/day were calculated by multiplying by a factor of 453.6 and dividing by 365 days. Source: USDA, 1993.



Table 11-15. Adult Mean Daily Intake (as consumed) of Meat and Poultry Grouped by Region and Gender<sup>a</sup>

#### Mean Daily Intake (g/day)

#### Region

						O				
P 15	Pa	cific	Mo	untain	North	Central	No	rtheast	S	outh
Food Item	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Beef	84.8	52.8	89.8	59.6	86.8	55.9	71.8	46.6	87.3	54.9
Pork	18.6	12.6	23.7	16.8	26.5	18.8	22.4	15.9	24.4	17.2
Lamb	1.3	1.2	0.5	0.3	0.4	0.4	1.3	1.0	0.5	0.3
Veal	0.4	0.2	0.2	0.2	0.4	0.4	2.8	1.5	0.3	0.3
Variety										
Meats/Game	11.1	7.9	9.1	7.4	11.9	8.0	8.1	6.8	9.4	7.8
Processed Meats	22.8	15.4	22.9	13.2	26.3	15.8	21.2	15.5	26.0	17.0
Poultry	67.3	56.1	51.0	45.2	51.7	44.7	56.2	49.2	57.7	50.2

<sup>&</sup>lt;sup>a</sup> Adult population represents consumers ages 19 and above.

NOTE: Pacific = Washington, Oregon and California

Mountain = Montana, Idaho, Wyoming, Utah, Colorado, New Mexico, Arizona, and Nevada

North Central = Ohio, Illinois, Indiana, Wisconsin, Michigan, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas.

Northeast = Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, and Pennsylvania.

South = Maryland, Delaware, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Texas, and Oklahoma.

Source: National Livestock and Meat Board, 1993.

Table 11	Table 11-16. Amount (as consumed) of Meat Consumed by Adults Grouped by Frequency of Eatingse						
		Percent	of Eaters				
Frequency of Eatings	Percent of Total Eaters	Male	Female	Total Consumption for 14 Days (g)	Median Daily Intake (g/day)		
Non-Meat Eaters <sup>a</sup>	1%	20	80	None	None		
Light Meat Eaters <sup>b</sup>	30%	27	73	<1025	54		
Medium Meat Eaters <sup>c</sup>	33%	39	61	1025-1584	93		

<sup>&</sup>lt;sup>a</sup> A female who is employed and on a diet. She lives alone or in a small household (without children).

36%

2.7

>1548

Source: National Livestock and Meat Board, 1993.

Heavy Meat Eaters

b Female who may or may not be on a diet. There are probably 2-4 people in her household but that number is not likely to include children.

This person may be of either sex, might be on a diet, and probably lives in a household of 2-4 people, which may include children.

Male who is not on a diet and lives in a household of 2-4 individuals, which may include children.

<sup>&</sup>lt;sup>e</sup> Adult population represents consumers ages 19 and above.



Table 11-17. Percentage Lipid Content (Expressed as Percentages of 100 Grams of Edible Portions) of Selected Meat and Dairy Products <sup>a</sup>					
Product	Fat Percentage	Comment			
Meats					
Beef	6.16	Raw			
Lean only	9.91	Cooked			
J	19.24	Raw			
Lean and fat, 1/4 in. fat trim	21.54	Cooked			
Brisket (point half)					
Lean and fat					
Brisket (flat half)					
Lean and fat	22.40	Raw			
Lean only	4.03	Raw			
Pork					
	5.88	Raw			
Lean only					
I 1 C-4	9.66	Cooked			
Lean and fat	14.95	Raw			
	17.18	Cooked			
Cured shoulder, blade roll, lean and fat	20.02	Unheated			
Cured ham, lean and fat	12.07	Center slice			
Cured ham, lean only	7.57	Raw, center, country style			
Sausage	38.24	Raw, fresh			
Ham	4.55	Cooked, extra lean (5% fat)			
Ham	9.55	Cooked, (11% fat)			
Lamb					
Lean	5.25	Raw			
2011	9.52	Cooked			
Lean and fat	21.59	Raw			
Eculi unu fat	20.94	Cooked			
Veal					
Lean	2.87	Raw			
2001	6.58	Cooked			
Lean and fat	6.77	Raw			
Lean and lat	11.39	Cooked			
Rabbit					
Composite of cuts	5.55	Raw			
	8.05	Cooked			
Chicken					
Meat only	3.08	Raw			
ivicat Omy	3.08 7.41	Cooked			
Meat and skin					
ivieat and Skill	15.06	Raw Cooked			
	13.60	Cooked			
Turkey	0.00	D			
Meat only	2.86	Raw			
	4.97	Cooked			
Meat and skin	8.02	Raw			
	9.73	Cooked			
Ground	6.66	Raw			



Product	Fat Percentage	Comment
Dairy		
Milk	3.16	3.3% fat, raw or pasteurized
Whole	4.17	Whole, mature, fluid
Human	0.83	Fluid
Lowfat (1%)	1.83	Fluid
Lowfat (2%)	0.17	Fluid
Skim		
Cream		
Half and half	18.32	Table or coffee, fluid
Medium	23.71	25% fat, fluid
Heavy-whipping	35.09	Fluid
Sour	19.88	Cultured
Butter	76.93	Regular
Cheese		
American	29.63	Pasteurized
Cheddar	31.42	
Swiss	26.02	
Cream	33.07	
Parmesan	24.50; 28.46	Hard; grated
Cottage	1.83	Lowfat, 2% fat
Colby	30.45	
Blue	27.26	
Provolone	25.24	
Mozzarella	20.48	
Yogurt	1.47	Plain, lowfat
Eggs	8.35	Chicken, whole raw, fresh or frozen

 $<sup>^{\</sup>rm a}$  Based on the lipid content in 100 grams, edible portion. Source: USDA, 1979-1986.

	Table 11-18. Fat Content of Meat Products	
Meat Product	Total Fat	Percent Fat
3-oz cooked serving (85.05 g)	(g)	Content (%)
Beef, retail composite, lean only	8.4	9.9
Pork, retail composite, lean only	8.0	9.4
Lamb, retail composite, lean only	8.1	9.5
Veal, retail composite, lean only	5.6	6.6
Broiler chicken, flesh only	6.3	7.4
Turkey, flesh only	4.2	4.9
Source: National Livestock and Meat Boa	rd, 1993	

 $Table\ 11\text{-}19. \ \ Fat\ Intake,\ Contribution\ of\ Various\ Food\ Groups\ to\ Fat\ Intake,\ and\ Percentage\ of\ the\ Population\ in\ Various\ Meat\ Eater\ Groups\ of\ the\ U.S.\ Population$ 

	Total Population	Heavy Meat Eaters	Medium Meat Eaters	Light Meat Eaters	Non-Meat Eaters
Average Fat Intake (g)	68.3	84.5	62.5	53.5	32.3
Percent of Population	100	36	33	30	1
Meat Group (%) <sup>a</sup>	41	44	40	37	33
Bread Group (%)	24	23	24	26	25
Milk Group (%)	12	11	13	14	14
Fruits (%)	1	1	1	1	1
Vegetables (%)	9	9	9	9	11
Fats/oil/sweets (%)	13	12	13	14	17

 $<sup>^{\</sup>rm a}$   $\,$  Meat Group includes meat, poultry, dry beans, eggs, and nuts. Source: National Livestock and MeatBoard, 1993.

		Total	1	Males	I	Females
Age (yrs)	N	Mean Fat Intake (g/day)	N	Mean Fat Intake (g/day)	N	Mean Fat Intake (g/day)
2-11 (months)	871	37.52	439	38.31	432	36.95
1-2	1,231	49.96	601	51.74	630	48.33
3-5	1,647	60.39	744	70.27	803	61.51
6-11	1,745	74.17	868	79.45	877	68.95
12-16	711	85.19	338	101.94	373	71.23
16-19	785	100.50	308	123.23	397	77.46
20-29	1,882	97.12	844	118.28	638	76.52
30-39	1,628	93.84	736	114.28	791	74.06
40-49	1,228	84.90	626	99.26	602	70.80
50-59	929	79.29	473	96.11	456	63.32
60-69	1,108	69.15	646	80.80	560	59.52
70-79	851	61.44	444	73.35	407	53.34
≥ 80	809	54.61	290	68.09	313	47.84
Total	14,801	81.91	7,322	97.18	7,479	67.52
≥ 2	13.314	82.77	6.594	98.74	8.720	68.06

Total dietary fat intake includes all fat (i.e., saturated and unsaturated) derived from consumption of foods and beverages (excluding plain drinking water).



Beef liver         68.99         Raw           Chicken (light meat)         74.86         Raw, without skin           Chicken (dark meat)         75.99         Raw, without skin           Duck - domestic         73.77         Raw           Duck - wild         75.51         Raw           Goose - domestic         68.30         Raw           Ham - cured         66.92         Raw           Horse         72.63         Raw, roasted           63.98         Cooked, roasted	ood	Moisture Content Percent	Comments	
Beef liver       68.99       Raw         Chicken (light meat)       74.86       Raw, without skin         Chicken (dark meat)       75.99       Raw, without skin         Duck - domestic       73.77       Raw         Goose - domestic       68.30       Raw         Ham - cured       66.92       Raw         Horse       72.63       Raw, roasted         Lamb       73.42       Raw, composite, trimmed, re         Lard       0.00       Raw         Pork       70.00       Raw         Rabbit - domestic       72.81       Raw         Eggs       74.16       Cooked, roasted         Dairy Products         Eggs       74.57       Raw         Butter       15.87       Raw         Cheese American pasteurized       39.16       Regular         Cheese American pasteurized       39.16       Regular         Cheese American pasteurized       17.66       Regular         Cream, whipping, heavy       57.71 <t< td=""><td><u>Meat</u></td><td></td><td></td></t<>	<u>Meat</u>			
Chicken (light meat)       74.86       Raw, without skin         Chicken (dark meat)       75.99       Raw, without skin         Duck - domestic       73.77       Raw         Duck - wild       75.51       Raw         Goose - domestic       68.30       Raw         Ham - cured       66.92       Raw         Horse       72.63       Raw, roasted         Lamb       73.42       Raw, composite, trimmed, re         Lard       0.00       Raw         Pork       70.00       Raw         Rabbit - domestic       72.81       Raw         Turkey       74.16       Cooked, roasted         Dairy Products         Eggs       74.57       Raw         Butter       15.87       Raw         Cheese American pasteurized       39.16       Regular         Cheeddar       36.75       Swiss       37.21         Parmesan, hard       29.16       Parmesan, grated       17.66         Cream, whipping, heavy       57.71       Cottage, lowfat       79.31         Colby       38.20       Blue       42.41         Cream       53.75       Yogurt       Plain, with fat       85.07 <tr< td=""><td>Beef</td><td>71.60</td><td>Raw, composite, trimmed, retail cuts</td></tr<>	Beef	71.60	Raw, composite, trimmed, retail cuts	
Chicken (dark meat)       75.99       Raw, without skin         Duck - domestic       73.77       Raw         Duck - wild       75.51       Raw         Goose - domestic       68.30       Raw         Ham - cured       66.92       Raw         Horse       72.63       Raw, roasted         Lamb       73.42       Raw, composite, trimmed, re         Lard       0.00       Raw         Pork       70.00       Raw         Rabbit - domestic       72.81       Raw         69.11       Raw, roasted         Turkey       74.16       Cooked, roasted         Dairy Products       Segs       74.57       Raw         Butter       15.87       Raw         Cheese American pasteurized       39.16       Regular         Cheese American pasteurized       36.75       Regular         Cheddar       36.75       Regular         Swiss       37.21       Parmesan, hard       29.16         Parmesan, parted       17.66       Parmesan, grated       17.66         Cream, whipping, heavy       57.71       Cottage, lowfat       79.31         Colby       38.20       Blue       42.41       Lamble	Seef liver	68.99	Raw	
Chicken (dark meat)       75.99       Raw, without skin         Duck - domestic       73.77       Raw         Duck - wild       75.51       Raw         Goose - domestic       68.30       Raw         Ham - cured       66.92       Raw         Horse       72.63       Raw, roasted         Lamb       73.42       Raw, composite, trimmed, re         Lard       0.00       Raw         Pork       70.00       Raw         Rabbit - domestic       72.81       Raw         69.11       Raw, roasted         Turkey       74.16       Cooked, roasted         Dairy Products       Segs       74.57       Raw         Butter       15.87       Raw         Cheese American pasteurized       39.16       Regular         Cheese American pasteurized       39.16       Regular         Cheddar       36.75       Raw         Swiss       37.21       Parmesan, hard       29.16         Parmesan, grated       17.66       Parmesan, grated       17.66         Cream, whipping, heavy       57.71       Cottage, lowfat       79.31         Colby       38.20       Blue       42.41 <td< td=""><td>Chicken (light meat)</td><td>74.86</td><td>Raw, without skin</td></td<>	Chicken (light meat)	74.86	Raw, without skin	
Duck - wild       75.51       Raw         Goose - domestic       68.30       Raw         Ham - cured       66.92       Raw         Horse       72.63       Raw, roasted         Lamb       73.42       Raw, composite, trimmed, re         Lard       0.00       Raw         Pork       70.00       Raw         Rabbit - domestic       72.81       Raw         Furkey       74.16       Cooked, roasted         Dairy Products       2       Raw         Eggs       74.57       Raw         Butter       15.87       Raw         Cheese American pasteurized       39.16       Regular         Cheddar       36.75       Swiss       37.21         Parmesan, hard       29.16       Parmesan, grated       17.66         Cream, whipping, heavy       57.71       Cottage, lowfat       79.31         Colby       38.20       Blue       42.41         Cream       53.75       Yoguit         Plain, with fat       85.07       Palain, with fat         Human milk - estimated       Made from whole milk		75.99	Raw, without skin	
Goose - domestic Ham - cured Ham - cured Horse Flam - cured Flam -	Ouck - domestic	73.77	Raw	
Ham - cured       66.92       Raw         Horse       72.63       Raw, roasted         63.98       Cooked, roasted         Lamb       73.42       Raw, composite, trimmed, regard         Lard       0.00       Raw         Pork       70.00       Raw         Rabbit - domestic       72.81       Raw         Curkey       74.16       Cooked, roasted         Curkey       74.16       Cooked, roasted         Dairy Products       Segs       74.57       Raw         Sutter       15.87       Raw         Cheese American pasteurized       39.16       Regular         Cheddar       36.75       Regular         Cheddar       36.75       Regular         Cheddar       39.16       Regular         Coloby       38.20       Regular      <	Ouck - wild	75.51	Raw	
Ham - cured   66.92   Raw   Horse   72.63   Raw, roasted   Raw, roasted   G3.98   Cooked, roasted   Raw, composite, trimmed, research   Cooked, roasted   Raw, composite, trimmed, research   Cooked, roasted   Raw, composite, trimmed, research   Cooked, roasted	Goose - domestic	68.30	Raw	
Florse   F	Iam - cured	66.92	Raw	
Cooked, roasted   Raw, composite, trimmed, restard   Cooked, roasted   Raw, composite, trimmed, restard   Cooked   Raw, composite, trimmed, restard   Cooked   Raw   Raw   Raw   Rabbit - domestic   Raw   Ges.	Iorse		Raw. roasted	
Camb   73.42   Raw, composite, trimmed, research   Rard   0.00				
Lard       0.00         Pork       70.00       Raw         Rabbit - domestic       72.81       Raw         Furkey       74.16       Cooked, roasted         Dairy Products         Eggs       74.57       Raw         Butter       15.87       Raw         Cheese American pasteurized       39.16       Regular         Cheddar       36.75       Swiss         Swiss       37.21       Parmesan, hard       29.16         Parmesan, grated       17.66       Formal College, lowfat       79.31         Cottage, lowfat       79.31       Cottage, lowfat       79.31         Colby       38.20       Blue       42.41         Cream       53.75       Yogurt         Plain, lowfat       85.07       Plain, with fat       87.90       Made from whole milk         Human milk - estimated       Human milk - estimated	.amb		Raw, composite, trimmed, retail cuts	
Pork       70.00       Raw         Rabbit - domestic       72.81       Raw, roasted         Furkey       74.16       Cooked, roasted         Dairy Products         Eags       74.57       Raw         Butter       15.87       Raw         Cheese American pasteurized       39.16       Regular         Cheddar       36.75       Regular         Swiss       37.21       Farmesan, hard       29.16         Parmesan, grated       17.66       Farmesan, early for the particular of the partic			round out	
Rabbit - domestic       72.81       Raw         69.11       Raw, roasted         Furkey       74.16       Cooked, roasted     Pairy Products  Eggs  74.57  Raw  Butter  15.87  Raw  Cheese American pasteurized  Cheese American pasteurized  39.16  Regular  Cheddar  Swiss  37.21  Parmesan, hard  29.16  Parmesan, grated  17.66  Cream, whipping, heavy  57.71  Cottage, lowfat  79.31  Colby  38.20  Blue  42.41  Cream  Yogurt  Plain, lowfat  Plain, with fat  Human milk - estimated       85.07  Made from whole milk			Raw	
Furkey   Family   F				
Furkey       74.16       Cooked, roasted         Dairy Products       29.16       Raw         Butter       15.87       Raw         Cheese American pasteurized       39.16       Regular         Cheddar       36.75       Regular         Swiss       37.21       Parmesan, hard       29.16         Parmesan, parted       17.66       Parmesan, grated       17.66         Cream, whipping, heavy       57.71       Cottage, lowfat       79.31         Colby       38.20       Blue       42.41         Cream       53.75       Yogurt         Plain, lowfat       85.07       Made from whole milk         Human milk - estimated       Made from whole milk			Raw. roasted	
Eggs       74.57       Raw         Butter       15.87       Raw         Cheese American pasteurized       39.16       Regular         Cheddar       36.75       Raw         Swiss       37.21       Swiss         Parmesan, hard       29.16       Parmesan, grated         Cream, whipping, heavy       57.71       Cottage, lowfat       79.31         Colby       38.20       Blue       42.41         Cream       53.75       Cogurt         Plain, lowfat       85.07       Made from whole milk         Human milk - estimated       Made from whole milk	`urkey			
Eggs       74.57       Raw         Butter       15.87       Raw         Cheese American pasteurized       39.16       Regular         Cheddar       36.75       Regular         Swiss       37.21       Swiss         Parmesan, hard       29.16       Parmesan, grated         Cream, whipping, heavy       57.71       From the serior of t	Dairy Products			
Butter 15.87 Raw Cheese American pasteurized 39.16 Regular Cheddar 36.75 Swiss 37.21 Parmesan, hard 29.16 Parmesan, grated 17.66 Cream, whipping, heavy 57.71 Cottage, lowfat 79.31 Colby 38.20 Blue 42.41 Cream 45.75 Yogurt Plain, lowfat 85.07 Plain, with fat 87.90 Made from whole milk Human milk - estimated		74 57	Raw	
Cheese American pasteurized       39.16       Regular         Cheddar       36.75         Swiss       37.21         Parmesan, hard       29.16         Parmesan, grated       17.66         Cream, whipping, heavy       57.71         Cottage, lowfat       79.31         Colby       38.20         Blue       42.41         Cream       53.75         Cogurt       Vegunt         Plain, lowfat       85.07         Plain, with fat       87.90         Made from whole milk         Human milk - estimated				
Cheddar 36.75 Swiss 37.21 Parmesan, hard 29.16 Parmesan, grated 17.66 Cream, whipping, heavy 57.71 Cottage, lowfat 79.31 Colby 38.20 Blue 42.41 Cream 53.75 Yogurt Plain, lowfat 85.07 Plain, with fat 87.90 Made from whole milk Human milk - estimated				
Swiss     37.21       Parmesan, hard     29.16       Parmesan, grated     17.66       Cream, whipping, heavy     57.71       Cottage, lowfat     79.31       Colby     38.20       Blue     42.41       Cream     53.75       Cogurt     70       Plain, lowfat     85.07       Plain, with fat     87.90     Made from whole milk       Human milk - estimated			regular	
Parmesan, hard       29.16         Parmesan, grated       17.66         Cream, whipping, heavy       57.71         Cottage, lowfat       79.31         Colby       38.20         Blue       42.41         Cream       53.75         /ogurt       70         Plain, lowfat       85.07         Plain, with fat       87.90       Made from whole milk         Human milk - estimated				
Parmesan, grated       17.66         Cream, whipping, heavy       57.71         Cottage, lowfat       79.31         Colby       38.20         Blue       42.41         Cream       53.75         Yogurt       Yogurt         Plain, lowfat       85.07         Plain, with fat       87.90       Made from whole milk         Human milk - estimated				
Cream, whipping, heavy       57.71         Cottage, lowfat       79.31         Colby       38.20         Blue       42.41         Cream       53.75         / ogurt       70         Plain, lowfat       85.07         Plain, with fat       87.90       Made from whole milk         Human milk - estimated       47.90       Made from whole milk				
Cottage, lowfat 79.31 Colby 38.20 Blue 42.41 Cream 53.75 Yogurt Plain, lowfat 85.07 Plain, with fat 87.90 Made from whole milk Human milk - estimated				
Colby       38.20         Blue       42.41         Cream       53.75         Yogurt       85.07         Plain, lowfat       85.07         Plain, with fat       87.90       Made from whole milk         Human milk - estimated				
Blue       42.41         Cream       53.75         Yogurt       85.07         Plain, lowfat       85.07         Plain, with fat       87.90       Made from whole milk         Human milk - estimated	Colby			
Cream 53.75  Yogurt 85.07 Plain, lowfat 85.07 Plain, with fat 87.90 Made from whole milk Human milk - estimated				
Yogurt Plain, lowfat 85.07 Plain, with fat 87.90 Made from whole milk Human milk - estimated				
Plain, lowfat 85.07 Plain, with fat 87.90 Made from whole milk Human milk - estimated		33.73		
Plain, with fat 87.90 Made from whole milk Human milk - estimated	Oguit	05 07		
Iuman milk - estimated			Made from whole will.	
		87.90	Made from whole milk	
Trom UNDA Survey				
		07.50	Miles I Chairl	
Human 87.50 Whole, mature, fluid			whole, mature, fluid	
Skim 90.80 Lowfat 90.80 1%			407	

 $<sup>^{\</sup>rm a}$  Based on the water content in 100 grams, edible portion. Source: USDA, 1979-1986.





	Tabl	Table 11-22. Summary of Meat, Poultry, and Dairy Intake Studies	and Dairy Intake Studies	
Study	Survey Population Used in Calculating Intake	Types of Data Used	Units	Food Items
KEY STUDIES				
EPA Analysis of 1989/91 CSFII Data	Per capita	1989/91 CSFII data; Based on 3-day average individual intake rates.	g/kg-day; as consumed	Distributions of intake rates for total meats and total dairy; individual food items.
Pao et al., 1982	Consumers only serving size data provided	1977/78 NFCS 3-day individual intake data	g; as consumed	Distributions of serving sizes for meats, poultry, and diary products.
RELEVANT STUDIES	z <b>o</b> l			
AIHC, 1994	Adults, Per Capita	USDA NFCS 1977-78 data presented in the 1989 version of the Exposure Factors Handbook that were analyzed by Finley and Paustenbach (1992).	g/day	Distribution for beef consumption presented in @Risk format.
EPA's DRES (White et al., 1983)	Per capita (i.e., consumers and nonconsumers)	1977/78 NFCS 3-day individual intake data	g/kg-day; as consumed	Intake for a wide variety of meats, poultry, and dairy products presented; complex food groups were disaggregated
NLMB, 1993	Adult daily mean intake rates	MRCA's Menu Census	g/day; as consumed	Intake rates for various meats by region and gender.
USDA, 1980, 1992	Per capita and consumer only grouped by age and sex	1977/78 and 1987/88 NFCS 1-day individual intake data	g/day; as consumed	Total meat, poultry and fish, total poultry, total milk, cheese and eggs.
USDA, 1993	Per capita consumption based on 'food disappearance"	Based on food supply and utilization data which were provided by National Agricultural Statistics Service (NASS), Customs Service reports, and trade associations.	g/day, as consumed	Intake rates of meats, poultry, and diary products; intake rates of individual food items.
U.S. EPA/ORP, 1984a; 1984b	Per capita	1977/78 NFCS Individual intake data	g/day; as consumed	Mean intake rates for total meats, total diary products, and individual food items.
U.S. EPA/OST, 1989	Estimated lifetime dietary intake	Based on FDA Total Diet Study Food List which used 1977/78 NFCS data, and NHANES II data	g/day; dry weight	Various food groups; complex foods disaggregated



Table 11-23. Summary of Recommended Values for Per Capita Intake of Meat and Dairy Products and Serving Size					
Mean	95th Percentile	Multiple Percentiles	Study		
Total Meat Intake					
2.1 g/kg-day	5.1 g/kg-day	see Table 11-1	EPA Analysis of CSFII 1989-91 Data		
Total Dairy Intake					
8.0 g/kg-day	29.7 g/kg-day	see Table 11-2	EPA Analysis of CSFII 1989-91 Data		
Individual Meat and Dairy Pr	<u>roducts</u>				
see Table 11-3	see Table 11-3	see Table 11-3	EPA Analysis of CSFII 1989-91 Data		
Serving Size					
see Table 11-4	see Table 11-4	see Table 11-4	Pao et al., 1982		



Table 11-24. Confidence in Meats and Dairy Products Intake Recommendation				
Considerations	Rationale	Rating		
Study Elements				
Level of peer review	USDA CSFII survey receives high level of peer review. EPA analysis of these data has not been peer reviewed outside the Agency. (Peer review will be conducted as part of the peer review of this Handbook)	Medium (This will become a "high" once the Handbook's peer review is completed)		
Accessibility	CSFII data is publicly available	High		
Reproducibility	Enough information is included to reproduce results	High		
Focus on factor of interest	Analysis is specifically designed to address food intake	High		
Data pertinent to U.S.	Data focuses on the U.S. population	High		
Primary data	This is new analysis of primary data	High		
• Currency	Is the most current data publicly available	High		
Adequacy of data collection period	Survey is designed to collect short-term data.	Medium confidence for average values; Low confidence for long term percentile distribution		
Validity of approach	Survey methodology was adequate	High		
Study size	Study size was very large and therefore adequate	High		
Representativeness of the population	The population studied was the U.S. population.	High		
Characterization of variability	Survey was not designed to capture long term day-to-day variability. Short term distributions are provided for various age groups, regions, etc.			
Lack of bias in study design (high rating is desirable)	Response rate was adequate?	Medium		
Measurement error	No measurements were taken. The study relied on survey data.	N/A		
Other Elements				
Number of studies	1 CSFII is the most recent data publicly available. Therefore, it was the only study classified as key study.	Low		
Agreement between researchers	Although the CSFII was the only study classified as key study, the results are in good agreement with earlier data.	High		
Overall Rating	The survey is representative of U.S. population; Although there was only one study considered key, these data are the most recent and are in agreement with earlier data; the approach used to analyzed the data was adequate. However, due to the limitations of the survey design estimation of long-term percentile values (especially the upper percentiles) is uncertain.	High confidence in the average; Low confidence in the long- term upper percentiles		



Table 11-25. Confidence in Meat and Dairy Serving Size Recommendations				
Considerations	Rationale	Rating		
Study Elements				
Level of peer review	USDA NFCS survey receives high level of peer review.	High		
• Accessibility	The NFCS data are publicly available	High		
Reproducibility	Methodology is clearly explained	High		
Focus on factor of interest	Analysis is specifically designed to address food intake	High		
Data pertinent to U.S.	Data focuses on the U.S. population	High		
Primary data	The study analyzed primary data	High		
Currency	The data are old (i.e. 1977-78)	Low		
Adequacy of data collection period	Survey is designed to collect short-term data.	Medium		
Validity of approach	Survey methodology was adequate	High		
Study size	Study size was very large and therefore adequate	High		
Representativeness of the population	The population studied was the U.S. population.	High		
Characterization of variability	Survey was not designed to capture long term day-to-day variability. Short term distributions are provided	Medium		
<ul> <li>Lack of bias in study design (high rating is desirable)</li> </ul>	Response rate was adequate	Medium		
Measurement error	No measurements were taken. The study relied on survey data.	N/A		
Other Elements				
Number of studies	1	Low		
Agreement between researchers	Although serving size data may have been collected in other surveys, they have not been reported in any other study.	Low		
Overall Rating	The survey is representative of U.S. population; the approach used to analyzed the data was adequate. However, due to the limitations of the survey design estimation of long-term percentile values (especially the upper percentiles) is uncertain.	Medium		



#### **APPENDIX 11A**

Sample Calculation of Mean Daily Fat Intake Based on CDC (1994) Data



#### Chapter 11 - Intake of Meat and Dairy Products

Sample Calculation of Mean Daily Fat Intake Based on CDC (1994) Data

$$0.34 \times 2,095 \ kcal \times X = 82 \ g-fat$$

$$\therefore X = 0.115 \frac{g - fat}{kcal}$$

X is the conversion factor from kcal/day to g-fat/day. An example of obtaining the grams of fat from the daily TFEI (1591 kcal/day) for children ages 3-5 and their percent TFEI from total dietary fat (33 percent) is as follows:

1,591 
$$\frac{kcal}{day} \times 0.33 \times 0.12 \frac{g-fat}{kcal} = 63 \frac{g-fat}{day}$$